CLAIMS

What is claimed is:

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1. An horological device comprising:

a time cell, wherein the time cell has a substantially discharged state before a programming operation and has a controlled discharge state after the programming operation, and wherein the time cell transitions after the programming operation from the controlled discharge state to the substantially discharged state within a predetermined time period after the programming operation; and

reading means for reading a state of the time cell.

2. The horological device of claim 1 further comprising:

conversion means for converting the state of the time cell to an elapsed time period value representing an amount of time since storing the electrostatic charge.

3. The horological device of claim 1 further comprising:

a time detection unit for processing a time request to generate a time response after reading the time cell.

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4. A method for measuring time in an horological device, the method comprising:

discharging a stored electrostatic charge in a time cell in the horological device, wherein the time cell has a substantially discharged state before a programming operation and has a controlled discharge state after the programming operation, and wherein the time cell transitions after the programming operation from the controlled

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discharge state to the substantially discharged state within a predetermined time period after the programming operation; and

reading a state of the time cell.

5. The method of claim 4 wherein a length of the predetermined time period varies with an initial condition of the time cell after the programming operation.

6. The method of claim 4 further comprising:

determining whether or not the predetermined time period has elapsed since the time cell was programmed based upon the state read from the time cell.

7. The method of claim 6 further comprising:

in response to a determination that the predetermined time period has not elapsed, generating a time value representing that the predetermined time period has not elapsed.

8. The method of claim 6 further comprising:

in response to a determination that the predetermined time period has elapsed, generating a time value representing that the predetermined time period has elapsed.

9. The method of claim 8 wherein the generated time value is a number of time units representing the predetermined time period.

10. The method of claim 8 wherein the generated time value is a boolean value representing that the predetermined time period has elapsed.

11. The method of claim 4 further comprising:

reading at least one time cell in an array of time cells.

12. The method of claim 11 wherein at least one time cell in the array of time cells has a predetermined time period that differs from a predetermined time period of another time cell in the array of time cells.

13. The method of claim 11 wherein at least two time cells in the array of time cells have substantially identical predetermined time periods.

14. The method of claim 11 further comprising:

processing a time request through a time detection unit to generate a time response after reading one or more time cells within the array of time cells.

15. A computer program product on a computer readable medium for use in a data processing system for measuring time with an horological device, the computer program product comprising:

instructions for receiving a time measurement request for the horological device; and

instructions for reading a state of a time cell, wherein the time cell has a substantially discharged state before a programming operation and has a controlled

discharge state after the programming operation, and wherein the memory cell transitions after the programming operation from the controlled discharge state to the substantially discharged state within a predetermined time period after the programming operation.

16. The computer program product of claim 15 wherein a length of the predetermined time period varies with an initial condition of the time cell after the programming operation.

17. The computer program product of claim 15 further comprising:

instructions for determining whether or not the predetermined time period has elapsed since the time cell was programmed based upon the state read from the time cell.

18. The computer program product of claim 17 further comprising:

instructions for generating, in response to a determination that the predetermined time period has not elapsed, a time value representing that the predetermined time period has not elapsed.

19. The computer program product of claim 17 further comprising:

instructions for generating, in response to a determination that the predetermined time period has elapsed, a time value representing that the predetermined time period has elapsed.

20. The computer program product of claim 19 wherein the generated time value is a number of time units representing the predetermined time period.

21. The computer program product of claim 19 wherein the generated time value is a boolean value representing that the predetermined time period has elapsed.

22. The computer program product of claim 15 further comprising:

instructions for reading at least one time cell in an array of time cells.

23. The computer program product of claim 22 further comprising:

instructions for processing a time request through a time detection unit to generate a time response after reading one or more time cells within the array of time cells.

24. A method for measuring time comprising:

discharging a floating gate in a floating gate field effect transistor, wherein the floating gate field effect transistor comprises a floating gate and an insulating region of insulating material adjacent to the floating gate, wherein a discharge rate of a discharge process that discharges an electrostatic charge stored within the programmed floating gate is inversely related to a thickness of the insulating region, and wherein the thickness of the insulating region is selected to cause a threshold voltage

of the floating gate field effect transistor to reach a predetermined threshold voltage within a predetermined time period after programming the floating gate; and

performing a read operation on the floating gate field effect transistor to determine whether or not the predetermined time period has elapsed based on whether or not the floating gate field effect transistor has reached the predetermined threshold voltage.

25. The method of claim 24 wherein a length of the predetermined time period varies with an initial threshold voltage of the floating gate field effect transistor after programming the floating gate.

26. A reading device comprising:

coupling means for coupling, to the reading device, an article of manufacture, wherein the article of manufacture comprises a binary time cell; and

reading means for reading the article of manufacture.

27. The reading device of claim 26 wherein the binary time cell has a substantially discharged state before a programming operation and has a controlled discharge state after the programming operation, and wherein the binary time cell transitions after the programming operation from the controlled discharge state to the substantially discharged state within a predetermined time period after the programming operation.

28. The reading device of claim 26 wherein the article of manufacture is a smart card.

29. The reading device of claim 26 further comprising:

time determining means for determining whether or not a predetermined time period has elapsed since the binary time cell was programmed.